

The opinion in support of the decision being entered today was not written for publication and is not binding precedent of the Board.

Paper No. 16

**UNITED STATES PATENT AND TRADEMARK OFFICE**

**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

*Ex parte* JACK H. HETHERINGTON

Appeal No. 2005-0367  
Application No. 09/684,205

ON BRIEF

MAILED

JUN 22 2005

U.S. PATENT AND TRADEMARK OFFICE  
BOARD OF PATENT APPEALS  
AND INTERFERENCES

Before HAIRSTON, BARRY, and LEVY, *Administrative Patent Judges*.

BARRY, *Administrative Patent Judge*.

A patent examiner rejected claims 1-3, 5-12 and 14-26. The appellant appeals therefrom under 35 U.S.C. § 134(a).<sup>1</sup> We affirm-in-part.

**I. BACKGROUND**

The invention at issue on appeal is a capacitive position sensor that employs a movable dielectric coupled to an elongated member. More specifically, the movable dielectric is supported between stationary, signal-transmitting plates and at least one

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<sup>1</sup>The appellant also "note[s] that the Examiner continues to object to the disclosure. . . ." (Reply Br. at 2.) Rather than by appeal to the Board of Patent Appeals and Interferences, however, such an issue should have been settled by petition to the Director of the U.S. Patent and Trademark Office. See *In re Hengehold*, 440 F.2d 1395, 1403, 169 USPQ 473, 479 (CCPA 1971).

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stationary, signal-detecting plate. By measuring the charge on the detecting plate, a microprocessor determines the capacitance of the assembly. The microprocessor then uses the capacitance to calculate the position of the dielectric and the member. (Spec. at 7.)

In contrast to existing devices featuring potentiometers, optical couplers, or electrical contacts, asserts the appellant, the moving dielectric offers low cost and power and ease of manufacture and maintenance. He adds that his invention can be used to measure the position of a variety of devices including computer mice, keyboards, and joysticks. (*Id.*)

A further understanding of the invention can be achieved by reading the following claims.

1. A capacitive position sensor configured for interconnection to a utilization device, comprising:

a stationary signal-detecting capacitor plate;

a stationary signal-transmitting capacitor plate supported parallel to, and spaced apart from, the signal-detecting capacitor plate, the transmitting capacitor plate being divided into a plurality of electrically separated segments;

a dielectric element disposed between the signal detecting and signal-transmitting capacitor plates;

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an elongate member having a user-manipulable proximal end and a distal end coupled to the dielectric element, the member being operative to laterally shift the element in the x or y directions in a plane substantially parallel to the stationary plates as a function of user position;

circuitry in electrical communication with the stationary plates, the circuitry being operative to (a) measure the capacitance between each segment of the signal-transmitting plate and the signal-detecting plate, and (b) determine user position in the x or y directions as a function of the measured capacitance; and

an output for communicating the user position to the utilization device.

8. The position sensor according to claim 1, further comprising:

a pair of assemblies, each including a stationary signal-detecting capacitor plate,

a stationary segmented signal-transmitting capacitor plate, a dielectric element disposed between the plates, and an elongate member rotationally coupled to the dielectric element; and

wherein the elongate members are supported at right angles to one another to measure movement in x and y dimensions.<sup>2</sup>

25. A capacitive position sensor configured for interconnection to a utilization device, comprising:

a non-circular dielectric element rotatable in a plane perpendicular to an axis of rotation;

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<sup>2</sup>The appellant invites the Board "to review the amendment attempted by the Appellant," (Appeal Br. at 2), that "the Examiner did not enter. . . ." (*Id.*) Because it has not been entered, however, we decline to review the amendment.

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a pair of electrically conductive capacitor plates, one supported on either side of the dielectric element, neither plate consuming an entire radial area around the axis of rotation;

circuitry in electrical communication with the capacitor plates, the circuitry being operative to (a) measure the capacitance between the capacitor plates, and (b) determine the rotational position of the dielectric element as a function of the measured capacitance; and

an output for communicating the rotational position to the utilization device.

Claims 8, 9, 25, and 26 stand rejected under 35 U.S.C. § 112, ¶ 2, as indefinite. Claims 25 and 26 stand rejected under 35 U.S.C. § 102(e) as anticipated by U.S. Patent No. 6,304,091 ("Shahoian"). Claims 1-3, 5-7, 10-12, and 14-24 stand rejected under 35 U.S.C. § 103(a) as obvious over Shahoian and U.S. Patent No. 5,576,704 ("Baker").

## II. OPINION

Our opinion addresses the rejections in the following order:

- indefiniteness rejection of claims 8, 9, 25, and 26
- anticipation rejection of claims 25 and 26
- obviousness rejection of claims 1-3, 5-7, 11, 12, and 14-20
- obviousness rejection of claim 10
- obviousness rejection of claims 21 and 23
- obviousness rejection of claims 22 and 24.

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**A. INDEFINITENESS REJECTION OF CLAIMS 8, 9, 25, AND 26**

Rather than reiterate the positions of the examiner or the appellant *in toto*, we focus on the two points of contention therebetween. Regarding claims 8 and 9, the examiner asserts that the "[a]ppellant does not indicate clearly the movements of what object in the X and Y dimensions can be recorded." (Examiner's Answer at 12.) The appellant argues that in "Figure 8 . . . elongated members are supported at right angles to one another, so that as ball 820 rotates, movements in the X and Y dimensions can be recorded to provide a function such as the movement of a cursor on a two-dimensional screen display, or the like." (Appeal Br. at 9.)

"The test for definiteness is whether one skilled in the art would understand the bounds of the claim when read in light of the specification. *Orthokinetics Inc., v. Safety Travel Chairs, Inc.*, 806 F.2d 1565, 1576, 1 USPQ2d 1081, 1088 (Fed. Cir. 1986). If the claims read in light of the specification reasonably apprise those skilled in the art of the scope of the invention, Section 112 demands no more. *Hybritech, Inc. v. Monoclonal Antibodies, Inc.*, 802 F.2d 1367, 1385, 231 USPQ 81, 94 (Fed. Cir. 1986)." *Miles Labs., Inc. v. Shandon Inc.*, 997 F.2d 870, 875, 27 USPQ2d 1123, 1126 (Fed. Cir. 1993).

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Here, claim 8 recites in pertinent part the following limitations: "to measure movement in x and y dimensions." For its part, Figure 8 of the appellant's specification shows "a mouse configuration," (Spec. at 16), which features orthogonal X and Y shafts in contact with a rotatable ball 820. Referring to the Figure and the written description thereof, (*id.* at 16-17), we are persuaded that one skilled in the art would understand that it is the movement of the ball that is measured. Therefore, we reverse the indefiniteness rejection of claim 8 and of claim 9, which depends therefrom.

Regarding claims 25 and 26, the examiner asserts, "it is not clear what the Applicant means 'neither plate consuming an entire radial area around the axis of rotation. . . .'" (Examiner's Answer at 4.) The appellant argues, "[t]his simply means that neither plate forms a continuous electrical path around the axis of rotation; in other words, along at least one line extending radially out from the axis of rotation, each plate contains a discontinuity." (Appeal Br. at 9.)

Claim 25 recites in pertinent part the following limitations: "a pair of electrically conductive capacitor plates . . . neither plate consuming an entire radial area around the axis of rotation. . . ." In Figure 8 of the appellant's specification, "X transmitter PCB . . . is shown at 802," (Spec. at 16); "X detector PCB . . . is shown at 804, (*id.*); Y "transmitter PCB " is shown at 812, (*id.*); and Y "detector PCB" is shown at 814. (*id.*)

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Referring to the Figure and the written description thereof, (*id.* at 16-17), we are persuaded that one skilled in the art would understand that neither of the PCBs forms a continuous electrical path around the axis of rotation of either of the aforementioned X and Y shafts. Therefore, we reverse the indefiniteness rejection of claim 25 and of claim 26, which depends therefrom.

#### B. ANTICIPATION REJECTION OF CLAIMS 25 AND 26

"[T]o assure separate review by the Board of individual claims within each group of claims subject to a common ground of rejection, an appellant's brief to the Board must contain a clear statement for each rejection: (a) asserting that the patentability of claims within the group of claims subject to this rejection do not stand or fall together, and (b) identifying which individual claim or claims within the group are separately patentable and the reasons why the examiner's rejection should not be sustained."

*In re McDaniel*, 293 F.3d 1379, 1383, 63 USPQ2d 1462, 1465 (Fed. Cir. 2002) (citing 37 C.F.R. §1.192(c)(7)(2001)). "If the brief fails to meet either requirement, the Board is free to select a single claim from each group of claims subject to a common ground of rejection as representative of all claims in that group and to decide the appeal of that rejection based solely on the selected representative claim." *Id.*, 63 USPQ2d at 1465.

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Here, the appellant stipulates that "[c]laims 25 and 26 . . . stand or fall together." (Appeal Br. at 3.) For our part, we select claim 25 from the group as representative of the claims therein. With this representation in mind, we focus on the following points of contention between the examiner and the appellant:

- capacitor plates supported on either side of a dielectric
- neither plate consuming an entire radial area around an axis of rotation.

*1. Capacitor Plates Supported on either Side of a Dielectric*

The examiner finds, "the Shahoian reference implicitly discloses the two capacitor plates (a vane 110 corresponding to one of the claimed plates and a combination of elements 102-109 corresponding to another of the claimed plates, see figs. 3c and 3d) supported on either side of the dielectric member (107), in order to provide the capacitors (see col. 8, lines 26-51)." (Examiner's Answer at 9.) The appellant argues, "the dielectric 107 is actually bonded to one of the movable electrodes 110, a physical configuration which is structurally and functionally different from that of Appellant since, among other reasons, Appellant's capacitor plates are 'supported on either side of the dielectric element.'" (Appeal Br. at 3-4.)

In addressing the point of contention, the Board conducts a two-step analysis. First, we construe the representative claim at issue to determine its scope. Second, we determine whether the construed claim is anticipated.



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a. Claim Construction

"Analysis begins with a key legal question — *what is the invention claimed?*" *Panduit Corp. v. Dennison Mfg. Co.*, 810 F.2d 1561, 1567, 1 USPQ2d 1593, 1597 (Fed. Cir. 1987). In answering the question, "the Board must give claims their broadest reasonable construction. . . ." *In re Hyatt*, 211 F.3d 1367, 1372, 54 USPQ2d 1664, 1668 (Fed. Cir. 2000).

Here, claim 25 recites in pertinent part the following limitations: "a pair of electrically conductive capacitor plates, one supported on either side of the dielectric element. . . ." Giving the representative claim its broadest, reasonable construction, the limitations require a pair of capacitor plates, one plate supported on either side of a dielectric.

b. Anticipation Determination

"Having construed the claim limitations at issue, we now compare the claims to the prior art to determine if the prior art anticipates those claims." *In re Cruciferous Sprout Litig.*, 301 F.3d 1343, 1349, 64 USPQ2d 1202, 1206 (Fed. Cir. 2002). "[A]nticipation is a question of fact." *Hyatt*, 211 F.3d at 1371, 54 USPQ2d at 1667 (citing *Bischoff v. Wethered*, 76 U.S. (9 Wall.) 812, 814-15 (1869); *In re Schreiber*, 128 F.3d 1473, 1477, 44 USPQ2d 1429, 1431 (Fed. Cir. 1997)). "A prior art reference

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anticipates a patent claim if the reference discloses, either expressly or inherently, all of the limitations of the claim." *EMI Group N. Am., Inc., v. Cypress Semiconductor Corp.*, 268 F.3d 1342, 1350, 60 USPQ2d 1423, 1429 (Fed. Cir. 2001) (citing *Kalman v. Kimberly-Clark Corp.*, 713 F.2d 760, 771, 218 USPQ 781, 789 (Fed. Cir. 1983)). Of course, "this is not an 'ipsissimis verbis' test." *In re Bond*, 910 F.2d 831, 832, 15 USPQ2d 1566, 1567 (Fed. Cir. 1990) (citing *Akzo N.V. v. United States Int'l Trade Comm'n*, 808 F.2d 1471, 1479 & n.11, 1 USPQ2d 1241, 1245 & n.11 (Fed. Cir. 1986)).

Here, in Shahoian "[a] low-cost, high-resolution capacitive position sensor is provided using a variable capacitor." Abs., ll. 1-2. More specifically, "a dielectric is interposed between [a] vane and [at least one] stator, such that the vane overlaps at least a portion of the stator, creating a capacitance. . . ." *Id.* at ll. 3-5. The reference explains that the vane and the stator are both capacitive plates. Col. 4, ll. 49-50. Furthermore, Figures 3c and 3d of Shahoian show a vane 110; a plurality of stators 102, 104; and a "dielectric [107] positioned between [the] vane and stators." Col. 8, ll. 40-41. "The stators 102, 104 . . . can be traces on a fixed PCB 109 and the vane 110 can be a smaller PCB with a conductive trace. . . ." Col. 8, ll. 37-39. Because the stators and the vane are traces on PCBs, i.e., printed circuit boards, we find that the boards support the set of stators and the vane on either side of the dielectric. The coupling of the dielectric to the stators or to the vane does not change our finding.

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***2. Neither Plate Consuming an Entire Radial Area around an Axis of Rotation***

Observing that "claim 25 includes the limitation of capacitor plates which do not consume an entire radial area around an axis of rotation," (Appeal Br. at 4), the appellant argues that Shahoian does not "disclose such a limitation. . . ." (*Id.*)

**a. Claim Construction**

Claim 25 recites in pertinent part the following limitations: "neither plate consuming an entire radial area around the axis of rotation. . . ." Giving the representative claim its broadest, reasonable construction and in light of the reasons explained regarding the indefiniteness rejection, the limitations require that neither capacitor plate forms a continuous electrical path around an axis of rotation.

**b. Anticipation Determination**

In Shahoian, "[t]he vane 110 is rotated about axis B over the stators 102 and 104. . . ." Col. 8, ll. 41-42. Figure 3c of the reference, moreover, shows that neither the vane 110 nor the stators 102, 104 forms a continuous electrical path around the axis B. Therefore, we affirm the anticipation rejection of claim 25 and of claim 26, which falls therewith.

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**C. OBVIOUSNESS REJECTION OF CLAIMS 1-3, 5-7, 11, 12, AND 14-20**

The appellant stipulates that claims 2, 3, 5-7, 18, and 19 "stand or fall with claim 1," (Appeal Br. at 3), and that "claims 12-17 stand or fall with claim 11. . . ." (*Id.*)

Admitting "that Shahoian discloses the signal detecting capacitor plate (14/56/110) movable instead of stationary," (Examiner's Answer at 6), the examiner asserts, "[i]t would have been obvious to a person of ordinary skill in the art at the time of the invention was made to make the Shahoian signal detecting capacitor plate (14/56/110) . . . stationary, so that the Shahoian dielectric member (15/107) can shift laterally in a plane parallel substantially to two stationary plates, in view of the teaching in the Baker reference. . . ." (*Id.*) He offers the following explanation to support his assertion.

Since the signal detecting capacitor plate (14/56/110) is connected to a power source (58) of the electronic circuit (50) (see fig. 3a, col. 7, lines 20-22), the movement of the signal detecting capacitor plate (14/56/110) causes the power/voltage signal in the connection, varying and picking up unwanted noises in the nearby environment, thereby providing an uncorrected output signals (V1, V2) and inaccurate position of the user manipulandum or joystick handle. Furthermore, providing the Shahoian signal detecting capacitor plate being stationary would prevent a broken connection between the power source (58) and the Shahoian signal detecting capacitor plate.

(*Id.* at 11.) The "[a]ppellant cannot make sense of this additional argument," (Reply Br. at 1), but alleges that "the importation of the teachings of Baker would defeat the points of novelty of Shahoian." (*Id.*)

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"The presence or absence of a motivation to combine references in an obviousness determination is a pure question of fact." *In re Gartside*, 203 F.3d 1305, 1316, 53 USPQ2d 1769, 1776 (Fed. Cir. 2000) (citing *In re Dembiczak*, 175 F.3d 994, 1000, 50 USPQ2d 1614, 1617 (Fed. Cir. 1999)). Such a motivation "may be found in explicit or implicit teachings within . . . references themselves, from the ordinary knowledge of those skilled in the art, or from the nature of the problem to be solved." *WMS Gaming Inc. v. Int'l Game Tech.*, 184 F.3d 1339, 1335, 51 USPQ2d 1385, 1397 (Fed. Cir. 1999) (citing *In re Rouffet*, 149 F.3d 1350, 1355, 47 USPQ2d 1453, 1456 (Fed. Cir. 1998)). Here, the examiner has provided two detailed reasons for combining the teachings of Shahoian and Baker to provide stationary capacitive plates and a movable dielectric. Regarding the second reason, for example, Figure 3a of Shahoian shows a connection between capacitive plate 56 and ground 58. We agree with the examiner's finding that if the plate were stationary rather than movable, the connection would be less likely to break.

"[A]rgument of counsel cannot take the place of evidence." *In re Budnick*, 537 F.2d 535, 538, 190 USPQ 422, 424 (CCPA 1976) (citing *In re Schulze*, 346 F.2d 600, 145 USPQ 716 (CCPA 1965); *In re Cole*, 326 F.2d 769, 140 USPQ 230 (CCPA 1964)). Here, the appellant neglects to explain of how or why "import[ing] of the teachings of Baker would [allegedly] defeat the points of novelty of Shahoian," (Reply Br. at 1), let

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alone proffer evidence to support the allegation. Therefore, we affirm the obviousness rejection of claim 1; of claims 2, 3, 5-7, 18, and 19, which fall therewith; of claim 11; and of claims 12-17, which fall therewith. In addressing claim 20, the appellant relies on the same allegation. (Appeal Br. at 8.) Therefore, we also affirm the obviousness rejection of claim 20.

#### D. OBVIOUSNESS REJECTION OF CLAIM 10

The question of obviousness is "based on underlying factual determinations including . . . what th[e] prior art teaches explicitly and inherently. . . ." *In re Zurko*, 258 F.3d 1379, 1383, 59 USPQ2d 1693, 1696 (Fed. Cir. 2001) (citing *Graham v. John Deere Co.*, 383 U.S. 1, 17-18, 148 USPQ 459, 467 (1966); *Dembiczak*, 175 F.3d at 998, 50 USPQ at 1616; *In re Napier*, 55 F.3d 610, 613, 34 USPQ2d 1782, 1784 (Fed. Cir. 1995)). "A *prima facie* case of obviousness is established when the teachings from the prior art itself would appear to have suggested the claimed subject matter to a person of ordinary skill in the art." *In re Bell*, 991 F.2d 781, 783, 26 USPQ2d 1529, 1531 (Fed. Cir. 1993) (quoting *In re Rinehart*, 531 F.2d 1048, 1051, 189 USPQ 143, 147 (CCPA 1976)).

Here, the examiner makes the following findings.

[A]s noting in fig. 3a and the corresponding description at col. 7, lines 15-38 and col. 8, last line through col. 9, line 2, the Shahoian

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reference implicitly discloses the steps of providing the position sensor and placing the signal detecting plate (14/56/110) at a known electrical potential (a ground potential 58), placing the signal transmitting plate (12/52, 54/102-109) at a first electrical potential (a low potential of the drive signal from the oscillator 60), changing the potential on the signal transmitting plate (12/52, 54/102-109) to a second known potential (a high potential of the drive signal from the oscillator 60), measuring and storing the capacitance between the plates, repeating the above steps for each of segments (52, 54) and determining the position of the dielectric and elongated member (col. 7, line 15 through col. 9, line 13, specifically col. 8, lines 6-11).

(Examiner's Answer at 7-8.) The appellant argues, "[t]he steps of storing capacitor plates to known potentials, and repeating certain measurements as a function of such stored measurements are not to be found in this reference." (Appeal Br. at 7.)

"[L]imitations are not to be read into the claims from the specification." *In re Van Geuns*, 988 F.2d 1181, 1184, 26 USPQ2d 1057, 1059 (Fed. Cir. 1993) (citing *In re Zletz*, 893 F.2d 319, 321, 13 USPQ2d 1320, 1322 (Fed. Cir. 1989)). Here, the appellant's argument is not commensurate with the scope of the claim. More specifically, claim 10 recites neither "storing capacitor plates to known potentials," (Appeal Br. at 7), nor "repeating certain measurements as a function of such stored measurements. . . ." (*Id.* (emphasis added).) Unpersuaded of error in the examiner's findings, we affirm the obviousness rejection of claim 10.

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**E. OBVIOUSNESS REJECTION OF CLAIMS 21 AND 23**

The appellant stipulates that "[c]laims 21 and 23 . . . stand or fall together."

(Appeal Br. at 3.) For our part, we select claim 21 from the group as representative of the claims therein.

The examiner finds, "Baker discloses the elongated member including a pivoting (a cardan joint 118, fig. 1, col. 2, line 63) and the distal end (an actuating body 125) loosely coupled to the dielectric element (140). . . ." (Examiner's Answer at 8-9.) The appellant argues, "Figure 1 is a cross-section of the entire apparatus of Baker, and nowhere does this show an elongate element having a distal end which is loosely coupled to a *dielectric element*." (Appeal Br. at 8.)

For its part, Baker "relates . . . to a joystick that uses capacitive technology to determine the joystick position." Col. 1, ll. 5-7. "The joystick includes a control shaft 105 having a handle 107, which is universally, pivotally mounted relative to a base portion 110 about a pivotal point 115 in the form of a cardan joint 118. An actuating body 125 in the form of a disk is rigidly attached to the control shaft 105 about the pivot mounting 118." Col. 2, ll. 60-65. A "dielectric body 140 includes a radially extending disk-shaped section 143 and a rod member 145. The disk-shaped section 143 and rod



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member 145 are integrally formed with the cylindrical portion of the dielectric body 140. . . ." Col. 3, ll. 11-16. "In operation, the actuating body 125 engages the rod member 145, which moves the dielectric body 140 relative to the electrode pair 135 in response to pivotal movement of the control shaft 105." *Id.* at ll. 26-28.

Based on this disclosure, we find that the distal end of Baker's control shaft 105 is loosely coupled to its dielectric body 140. Therefore, we affirm the obviousness rejection of claim 21 and of claim 23, which falls therewith.

#### F. OBVIOUSNESS REJECTION OF CLAIMS 22 AND 24

The appellant stipulates that "[c]laims 22 and 24 . . . stand or fall together." (Appeal Br. at 3.) For our part, we select claim 22 from the group as representative of the claims therein.

The examiner finds, "noting in fig. 1 of Baker as well recognized by one of ordinary skill in the art at the time of the invention was made, if the spacing of the two stationary plates (135) is small, so that the friction force between the dielectric member (140) and the plates (135) will cause the movement of the dielectric member (140) constrained." (Examiner's Answer at 9.) The appellant argues, "there is no language whatsoever in either reference regarding the movement of a dielectric in a

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plane substantially parallel to the stationary plates due to a physical constraint."

(Appeal Br. at 9.)

For its part, Baker further discloses "a pair of spaced apart electrodes 135. . . ." Col. 3, ll. 5. As mentioned regarding claims 21 and 23, the reference "moves the dielectric body 140 relative to the electrode pair 135 in response to pivotal movement of the control shaft 105." Col. 3, ll. 27-28. Figure 1 of Baker, moreover, shows that the electrode pair 135 constrains the dielectric body 140 to move in a plane substantially parallel to the pair. Therefore, we affirm the obviousness rejection of claim 22 and of claim 24, which falls therewith.

### III. CONCLUSION

In summary, the rejection of claims 8, 9, 25, and 26 under § 112, ¶2, is reversed. The rejection of claims 25 and 26 under § 102(e), however, is affirmed. The rejection of claims 1-3, 5-7, 10-12, and 14-24 under § 103(a) is also affirmed.

"Any arguments or authorities not included in the brief will be refused consideration by the Board of Patent Appeals and Interferences. . . ." 37 C.F.R. § 1.192(a). Accordingly, our affirmance is based only on the arguments made in the briefs. Any arguments or authorities omitted therefrom are neither before us nor at

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Issue but are considered waived. *Cf. In re Watts*, 354 F.3d 1362, 1367, 69 USPQ2d 1453, 1457 (Fed. Cir. 2004) ("[I]t is important that the applicant challenging a decision not be permitted to raise arguments on appeal that were not presented to the Board.") No time for taking any action connected with this appeal may be extended under 37 C.F.R. § 1.136(a)(1)(iv).

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**AFFIRMED-IN-PART**

  
KENNETH W. HAIRSTON  
Administrative Patent Judge

~~LANCE LEONARD BARRY~~  
~~Administrative Patent Judge~~

  
STUART S. LEVY  
Administrative Patent Judge

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